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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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|-----------------|-------------|----------------------|---------------------|------------------|

09/138,429

08/24/1998

IMRAN HASHIM

AMAT/2406/MD

4066

60300 7590 12/13/2006

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EXAMINER

MERCADO, JULIAN A

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 12/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/138,429

Applicant(s)

HASHIM ET AL.

Examiner

Julian Mercado

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10-3-06.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-50 and 54-57 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-50 and 54-57 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application
- ☐ Other: _____.

DETAILED ACTION

Remarks

This Office action is responsive to applicant's amendment filed on October 3, 2006.

Claims 21-50 and 54-57 are pending.

This Office action presents a new ground of rejection and is therefore made NON-FINAL.

Claim Rejections - 35 USC § 103

The rejection of claims 27-29, 36-43, 55 and 56 under 35 U.S.C. 103(a) based on Hsu (U.S. Pat. 5,589,039) et al. and Miyata (U.S. Pat. 5,519,373) has been withdrawn.

The rejection of claims 30 and 44 under 35 U.S.C. 103(a) based on Hsu, Miyata, and Boys et al. (U.S. Pat. 4,500,409) has been withdrawn.

The rejection of claim 47 under 35 U.S.C. 103(a) based on Hsu et al., Miyata, and Tepman (U.S. Pat. 5,380,414) has been withdrawn.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

New Rejection: Claims 21, 22, 24, 31-36, 39-50 and 54-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa et al. (U.S. Pat. 4,865,709) in view of Miyata (U.S. Pat. 5,519,373)

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For claims 21, 22, 24, 31-36, 39-50 and 54-57, Nakagawa et al. teaches an apparatus for depositing a magnetic film such as a magnetic head comprising a sputtering chamber [1] containing a target [4], substrate support [5] having a surface separated from the target, and a magnet array [6A] disposed within the sputtering chamber which forms a magnetic field that is substantially parallel along the surface of the substrate support and comprised of permanent magnets, "a parallel magnetic field (perpendicular to the longitudinal direction) is applied to the substrates 3." See col. 1 line 8 et seq. and col. 9 lines 31-37. As the focus and placement of this magnetic field is specific to the substrate, it would naturally flow to be flatter and more parallel to the substrate than at the target.

For claims 31, 43, 46, 47, 49, 50, 55, 56 and 57, a magnetron [7] is additionally placed in the back of the target. See col. 4 line 55 et seq. Furthermore, the grounded shield [8] is deemed readable on the claimed grounded collimator. See col. 4 line 59 et seq. As to removing charges and reducing interference, while features of an apparatus may be recited either functionally or structurally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. Thus, these limitations have not been given patentable weight as the functional limitations fail to further limit the claimed apparatus by merely reciting limitations of intended use. Notwithstanding, it is asserted that the shield would naturally flow to have, inherently, the same effect of removing charges and reducing interference as claimed as these functions are within the functional definitions of a shield, particularly one that is also grounded, absent of a showing by applicant that the claimed invention distinguishes over the reference. *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977) and *In re Spada*, 15 USPQ 2d 1655 (Fed. Cir. 1990)

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Nakagawa et al. does not explicitly teach the magnet array to be annular in shape and surrounding an outer periphery of the substrate support surface. However, Miyata teaches a stationary magnetic field using a stationary magnet array which results in a substantially parallel magnetic field about the target surface. See Figure 5 and col. 5 line 1-12. The examiner additionally notes that Miyata's invention is specifically disclosed for a magnetron sputtering apparatus. (col. 1 line 7-13) Thus, at the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify Hsu's invention by providing a substantially parallel magnetic field at the surface of the substrate during sputtering. The motivation for such a modification would be to enhance sputtering efficiency and allow for more economical use of costly target material (see Miyata, col. 1 line 36-52) along with employing a substantially parallel magnetic field as specifically called for by Hsu.

For claims 35 and 42, the annular magnet array as rendered obvious by the prior art is considered to be a Halbach array in providing a parallel magnetic field, notably consistent with applicant's definition thereof. (specification on page 4, line 29 et seq.)

For claims 22, 36 and 44, the target is a magnetic substance such as Permalloy. See col. 5 lines 26-29.

Claims 23, 25-30, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa et al. (U.S. Pat. 4,865,709) in view of Miyata (U.S. Pat. 5,519,373), and further in view of Boys et al. (U.S. Pat. 4,500,409).

The teachings of Nakagawa et al. and Miyata are discussed above.

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For claims 25 and 30, for the aforesaid reasons the target in Nakagawa et al. is a magnetic substance such as Permalloy, which is a Ni/Fe alloy. Note that Boys similarly teaches that Permalloy is known in the art as Ni/Fe alloy. See col. 12 line 23.

For claims 23, 26, 29 and 37, while Nakagawa et al. does not explicitly teach a long throw distance of at least 50 mm (claims 23 and 26), Boys teaches a long throw distance equal to 2.5 in or 63 mm. (Col. 12 line 37) Thus, it would have been obvious to one of ordinary skill in the art to further modify Nakagawa et al.'s invention by employing a long throw distance of at least 50 mm, for reasons such as enhancing the deposition rate and uniformity.

For claims 27, 28, while Nakagawa et al. does not explicitly teach the claimed chamber pressure, Boys teaches a pressure of 4 mTorr. See col. 12 line 35. The skilled artisan would find obvious to employ the claimed pressure in Nakagawa et al.'s invention in order to effect sputter plasma formation, since the formed sputter plasma is requisitely of a low pressure, high energy field gas.

For claim 38, for the aforesaid reasons an annular magnet is deemed readable on a Halbach array in similarly providing a parallel magnetic field.

Allowable Subject Matter

The allowability of the present claims are withdrawn in view of newly cited art.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian Mercado whose telephone number is (571) 272-1289. The examiner can normally be reached on Monday through Friday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Julian



PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER